AMENDED CLAIM SET:

1. - 30. (canceled)

31. (new) A method for producing an oxynitride layer, the method comprising:

providing a wafer of Ge-based material, the Ge-based material having a first surface; and

carrying out a two step process consisting of a first step followed by a second step, wherein the first step consists of incorporating underneath the first surface a first concentration of nitrogen having a surface density of between about 1E14 per cm^2 and 3E15 per cm^2, and wherein the second step consists of exposing the first surface to an oxygen containing ambient, thereby oxidizing the Ge-based material and growing the oxynitride layer, wherein the first concentration is so chosen as to govern the oxidizing rate during the second step, wherein the produced oxynitride layer is controlled to be between 0.5nm and 5nm of equivalent oxide thickness (EOT).

32. (new) The method of claim 31, wherein the Ge-based material consists essentially of Ge.

33. (new) The method of claim 31, wherein the first step is carried out by subjecting the first surface to a nitrogen containing gas under thermal conditions.

34. (new) The method of claim 33, wherein the nitrogen containing gas is NH_3, and the thermal conditions are selected to be between 450°C and 700°C applied for between 1 second and 300 seconds.

35. (new) The method of claim 31, wherein the first step is carried out by ion implanting a nitrogen dose into the first surface.

36. (new) The method of claim 35, wherein the nitrogen dose is selected to be between about 1E15 per cm^2 and 2E16 per cm^2 with an implantation energy of between about 0.5KeV and 10keV.

37. (new) The method of claim 36, wherein the ion implanting is carried out through a screen layer.

38. (new) The method of claim 31, wherein the first step is carried out by subjecting the first surface to a nitrogen containing plasma applied with a power of between about 25W and 1000W, at a temperature of between about room temperature and 500°C, and for a time of between about 1sec and 300sec.

39. (new) The method of claim 31, wherein the second step is carried out by subjecting the first surface under thermal conditions to species selected from the group consisting of

O_2, O_3, H_2O, NO, N_2O, and combinations of these species thereof.

40. (new) The method of claim 39, wherein the thermal conditions are selected to be between 500°C and 700°C applied for between 1 minute and 30 minutes.

41. (new) The method of claim 31, wherein the second step is carried out by subjecting the first surface to an oxygen containing plasma applied with a power of between about 25W and 1000W, at a temperature of between about room temperature and 500°C, and for a time of between about 1sec and 300sec.

42. (new) The method of claim 31, wherein the method further comprises cleaning the first surface before the first step, wherein the cleaning comprises at least one application of an oxidation and oxide removal cycle, wherein the oxidation is accomplished with an H_20_2 containing solutions, and the oxide removal is accomplished by a stripping agent, wherein the stripping agent is HF, HCl, or their mixture thereof.

43. (new) The method of claim 31, wherein the first surface is having at least two locations, and wherein the first step is carried out on the at least two locations in a manner to yield differing first concentrations, whereby the produced oxynitride layers on the least two locations have differing EOT.

44. (new) A method for fabricating a high performance Ge-based field effect device, wherein the device comprising a oxynitride layer gate dielectric, and production of the oxynitride layer is comprising:

providing a wafer of Ge-based material, the Ge-based material having a first surface; and

carrying out a two step process consisting of a first step followed by a second step, wherein the first step consists of incorporating underneath the first surface a first concentration of nitrogen having a surface density of between about 1E14 per cm^2 and 3E15 per cm^2, and wherein the second step consists of exposing the first surface to an oxygen containing ambient, thereby oxidizing the Ge-based material and growing the oxynitride layer, wherein the first concentration is so chosen as to govern the oxidizing rate during the second step, wherein the produced oxynitride layer is controlled to be between 0.5nm and 5nm of equivalent oxide thickness (EOT).

45. (new) The method for fabricating of claim 44, wherein the high performance Ge-based field effect device is a Ge MOS transistor.

46. (new) A method for producing a germanium oxynitride layer, the method comprising:

providing a wafer, the wafer having a Ge surface; and

carrying out a two step process consisting of a first step followed by a second step, wherein the first step consists of incorporating underneath the Ge surface a first

concentration of nitrogen having a surface density of between about 1E14 per cm^2 and 3E15 per cm^2, and wherein the second step consists of exposing the Ge surface to an oxygen containing ambient, thereby oxidizing the Ge and growing the germanium oxynitride layer, wherein the first concentration is so chosen as to govern the oxidizing rate during the second step, wherein the produced germanium oxynitride layer is controlled to be between 0.5nm and 5nm of equivalent oxide thickness (EOT).